

March 15, 2013

**VIA ELECTRONIC DELIVERY**

Marlene H. Dortch, Secretary  
Federal Communications Commission  
445 12th Street, SW  
Room TWA325  
Washington, DC 20554

Re:           **Notice of Ex Parte Presentations**  
                **WT Docket No. 12-69**

In the Matter of Promoting Interoperability in the 700 MHz Commercial Spectrum & Interoperability of Mobile User Equipment Across Paired Commercial Spectrum Blocks in the 700 MHz Band, WT Docket No. 12-69 & RM-11592 (Terminated)

Dear Ms. Dortch:

## **700 MHz mobile spectrum: A sad tale of regulatory and interoperability failure**

- By Neal Gompa on May 1, 2013



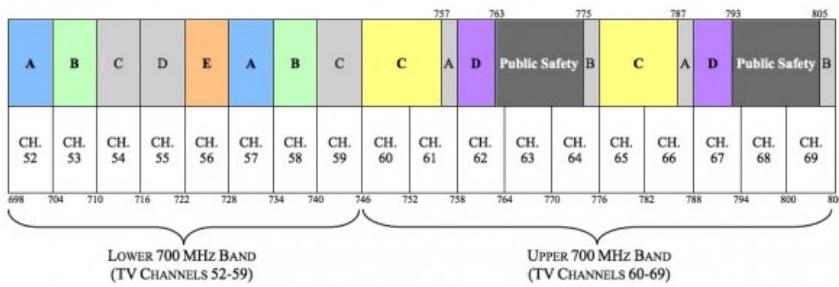
In 2008, the FCC auctioned off some of the frequencies freed up from the transition to digital television. The auction was a financial success for the FCC, but the actions after the

auction led it to become a competitive and interoperability failure.

# In the beginning

The FCC had split the frequencies for 698-806 MHz into two major ranges: Lower 700 MHz and Upper 700 MHz. The frequency split was required because Upper 700 MHz had what is known as a “reverse duplex.” That means the reception frequencies are on the lower part of the range, while the transmission frequencies are on the upper part of the range. The reverse duplex was implemented in order to reduce interference issues from the Lower 700 MHz range.

## **Revised 700 MHz Band Plan for Commercial Services**



## Lower 700 MHz

The Lower 700 MHz range covers 698-746 MHz. This range previously offered analog TV channels 52-59. This range of

frequencies has a mixed arrangement. The FCC decided to codify Channels 52 and 57 as the A block. Channels 53 and 58 are the B block. The C block had been codified and auctioned prior to 2008, and it uses channels 54 and 59. These blocks are known as “paired blocks.” They have two sets of frequencies to form a band block.

Notably, channels 55 and 56 aren't mentioned. That is because the FCC configured these as "unpaired blocks." Channel 55 became the D block prior to auction. Channel 56 became the E block for the auction. These frequencies will become important later.

## Upper 700 MHz

The Upper 700 MHz range covers 746-806 MHz. This range previously offered analog TV channels 60-69. Unlike the Lower 700 MHz range, Upper 700 MHz has a simple layout. Channels 60-61 and 65-66 comprise the C block (with the exception of a sliver of the end

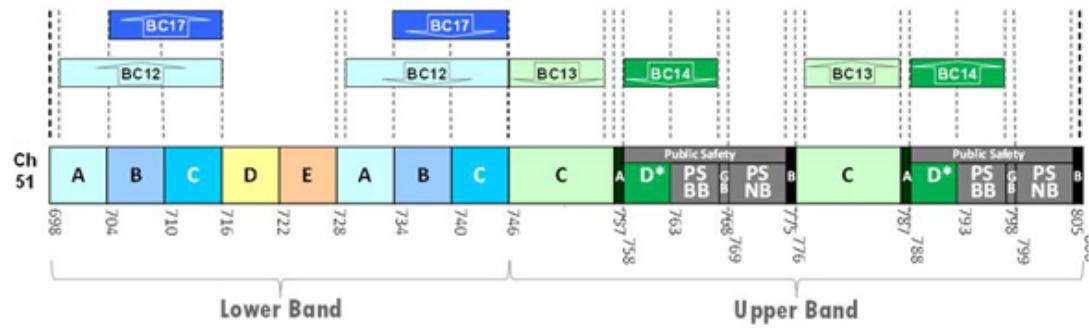
of channels 61 and 66 used for the A block). Channels 62 and 67 are used for the D block, which has been added to the Public Safety allocation on channels 63-64 and 68-69. However, a tiny sliver at the end of channels 64 and 69 is allocated for the B block instead.

## Auction 73

Auction 73 was the auction that the FCC held to sell the licenses to the frequencies not already sold in prior auctions. In this auction, there was a bit of drama. Google placed a “stalking bid” of a monumental \$4.6 billion to ensure that the Upper 700 MHz C block spectrum has the open-access requirements that ensure that any compatible device can be used on the network built on that spectrum, as well as ensuring that devices built for that spectrum were unlocked for use with any compatible network. Verizon Wireless later outbid Google and became required to honor those rules.

By this point, operators had expected that the Lower 700 MHz frequencies would be fully homogenized into a single band specification with the 3GPP for LTE, with a separate band specification for the Upper 700 MHz frequencies. However, it got complicated...

## 700 MHz Band Plan & 3GPP Band Classes



“BCxx” indicates Band Classes proposed as part of the international 3GPP industry LTE technical standards processes.

\*The D Block will be reallocated for use by public safety entities as directed by recent Congressional mandate.

## Band fragmentation

During the auction, the 3GPP was only considering a single band specification for the Lower 700 MHz spectrum. This specification is codified as 3GPP band class 12, which covers the Lower 700 MHz A, B, and C blocks with a 1 MHz guard at the beginning of the A

block. Shortly after the auction closes, band class 17 is proposed. Band class 17 is identical to band class 12 except that it eliminates the Lower 700 MHz A block from the specification. Thus, it only specifies coverage for Lower 700 MHz B and C blocks.

Similarly for Upper 700 MHz, band class 13 was proposed and codified to only support Upper 700 MHz C block spectrum. The D block and public safety spectrum was codified into band class 14 much later.

This means that LTE devices for AT&T (band class 17) will not work on Verizon Wireless' LTE network (band class 13) because the frequencies are totally different. On top of that, AT&T LTE devices cannot be used with band class 12 networks since they use Lower 700 MHz A block frequencies. Those frequencies are not covered by the band class 17 specification at all.

The rationale for the creation of band class 17 was to use the Lower 700 MHz A block as a de facto guard against digital channel 51 TV operations and Lower 700 MHz E block operations. According to Qualcomm, it is not possible to effectively filter out interference without significant diminishing in RF performance. Qualcomm did develop a new radio transceiver to support both bands 12 and 17 on the same device through separate radio chains, but clearly no such devices were ever ordered (or able to be ordered).

However, the creation of band class 17 and subsequent adoption by AT&T (instead of band class 12) caused the ecosystem for band class 12 hardware to crash. AT&T only ordered band class 17 equipment. Its requests for proposals for infrastructure (tower hardware) and user equipment (phones, tablets, and others) specifically indicated band class 17 support only. The many smaller operators throughout the country depending on AT&T helping to develop the ecosystem were left with nearly useless spectrum.

### **It gets worse...**

Because AT&T was solely developing the band class 17 ecosystem, the operators holding onto Lower 700 MHz A block spectrum had a difficult time securing the necessary equipment to make it usable. To date, only U.S. Cellular has managed to do so. The problem with this is the FCC's requirements imposed on licensees of Lower 700 MHz A

block spectrum. Each and every Lower 700 MHz A block license must be built out to cover at least 35% of the geographic area within four years from the analog TV shutoff date (June 13, 2009).

That deadline has been [extended to December 13, 2013](#).

Next page: [The technical issues are solvable, if the FCC does something about it](#)

## The technical issues are solvable

In a [report submitted to the FCC by V-Comm](#) (a consulting firm), a detailed analysis shows that proper coordination among the channel 51 broadcast station, the E block user, and the Lower 700 MHz A block operator makes it possible for usable LTE service to be available. [AT&T attempted to refute the report](#) by stating that forcing AT&T to order devices that support band class 12 for LTE will not guarantee better access to devices, especially since most band class 12 operators are CDMA operators, rather than GSM ones. AT&T further argues that it would be subject to “substantial” interference regardless (and thus, V-Comm is wrong), and that the FCC has no power to enforce such a requirement anyway. [V-Comm replied to that with clarifications](#) on the report and to stand firm behind the report.

## Ultimately, the industry is indecisive

The smaller operators (backed by the Competitive Carriers Association) want the FCC to push a mandate to boost the ecosystem and encourage development of the band. [According to U.S. Cellular](#), there is a dearth of band class 12 devices. Additionally, it is a very simple change (a swap of duplexers and filters in the radio chain) to transform any band class 17 LTE device into a band class 12 LTE device.

The Competitive Carriers Association [has been urging the FCC to push a mandate](#) because it feels an industry-led solution appears to be impossible at this stage. It argues that the lack of scale of the many smaller operators it represents are unable to secure what

they need to invest in LTE on band class 12 because of the abandonment of the band. It reiterated that **testing showed a lack of implausibly-fixable interference issues**. Finally, the CCA noted that AT&T's arguments about 3G fallback will be irrelevant as VoLTE is deployed by band class 12 operators and AT&T (with proper roaming agreements in place, of course).

### **The FCC *must do something...***

The FCC needs to do something about the 700MHz interoperability problem. Without some form of interoperability enforcement, parts of perfectly usable spectrum will remain useless. This would be a **similar situation to what happened with WCS years ago**. WCS was unable to be used until the bickering stopped and something was developed by the industry when the pressure is just too high to ignore it any longer. While **the WCS situation turned out well in the end**, there is no guarantee that it will for Lower 700MHz.

This problem does not just affect the United States: it affects Canada, too. **Canada will auction the 700MHz band in November 2013** with the **same band plan as the US 700MHz spectrum**. This means that the band class 12 issues *need to be solved now* or the same problem will spill over to Canada. It no longer is a domestic problem, it is an international one.

Canada has a less competitive wireless market than the US does. Partly because of Canada's historic protectionism, but also partly because the major operators in Canada (Bell, Telus, and Rogers) have even more influence over regulators than AT&T, Verizon Wireless, Sprint, and T-Mobile have over the US regulators. Even so, the Canadian authorities are limiting how much spectrum that licenses can be acquired for any given operator, which the FCC does not do. It is highly likely that the Lower 700 MHz A block spectrum will be considered undesirable (especially by smaller operators) if these issues are not resolved before the auction.

So not only does the issue need to be fixed to improve competition in the US wireless market, it needs to be fixed to give smaller Canadian operators the chance to better compete with larger rivals.

